

DOCUMENT RESUME

ED 218 577

CG 016 078

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TITLE Reaction to Stress as a Predictor of Academic Success.
PUB DATE Apr 82
NOTE 13p.; Paper presented at the Annual Meeting of the Georgia Academy of Science, (Columbus, GA, April 1982).
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; *Coping; Grade Point Average; Physiology; Predictive Validity; *Predictor Variables; *Stress Variables; *Student Adjustment; Student Characteristics; Test Anxiety; Two Year Colleges; *Two Year College Students
IDENTIFIERS *Scholastic Aptitude Test

ABSTRACT

Although studies on test anxiety are abundant in the research literature, there are few investigations of the relationship of stress to academic achievement. To test the hypothesis that maladaptive methods of coping with stress are related to academic achievement in greater magnitude than the relationship of Scholastic Aptitude Test (SAT) scores, 800 junior college students responded to a stress inventory. Results supported the hypothesis. Students who used unhealthy methods of coping with stress (e.g., running away, drinking alcoholic beverages, acting out in anger) were less likely to receive good grades. Students who reacted to stress with physiological symptoms received higher grades than those who did not. Those students who received higher grades tended to internalize stress effects, using themselves as scapegoats rather than society. Both maladaptive coping methods and physiological responses were better predictors of grade point average than SAT scores. The findings suggest a need for further replication studies on the same type of student population. (JAC)

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Paper presented at the annual meeting of the Georgia Academy
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REACTION TO STRESS AS A PREDICTOR OF ACADEMIC ACHIEVEMENT

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College students make considerable use of the word "stress" in conversation with peers and faculty. Obviously the college experience can be stressful, but there is a dearth of information on students' reports of stress and how they attempt to cope with it.

Educators continue to search for factors that contribute to or are associated with academic achievement, but a class of variables that has received little attention in the literature is that involving stress. A closely related problem, that of test anxiety, has become an area of major interest since it first attracted attention in the 1950's. Test anxiety has become a field of major educational interest (Cullar and Holahan, 1980).

Test anxiety has been documented in numerous studies which suggest methods for treating students who are test anxious. Zuckerman and Spielberger's 1975 book well supports this statement. According to Tobias (1979), anxiety is a major psychological variable in education and there is a significant body of research linking anxiety to students' ability to profit from instruction. Cullar and Holahan (1980) noted that studies relating test anxiety to college students' academic progress have generally supported the finding that test anxiety lowers grade point average.

Spielberger's (1966) differentiation between state anxiety and trait anxiety has attracted considerable attention. He defined state anxiety as feelings of apprehension and heightened autonomic nervous system activity

while trait anxiety is a generalized predisposition to experience state anxiety. He found that state anxiety is more likely to be significantly related to learning performance. This conclusion has been supported in other studies, among them Meyers and Martin (1974).

Some differentiation between stress and anxiety and an attempt at definition is necessary here. According to Hilgard et. al. (1971), anxiety is a "state of apprehension or uneasiness . . . the object of anxiety is ordinarily less specific than the object of fear." Stress (McGrath, 1970) occurs when there is considerable imbalance between perceived or subjective demand and perceived response capability. A person is not threatened by demands in a situation he or she feels capable of handling without undue expenditure of resources. A person is threatened by the anticipation that he or she will not be able to adequately cope with perceived demands. It follows, therefore, that anxiety is a component of stress and not a separate entity.

Although studies on test anxiety are abundant in the literature, there are few investigations of the relationship of stress to academic achievement. Spence and Spence (1966) hypothesized that stress, in addition to increasing drive level also elicits task irrelevant responses in high-anxious subjects. When stress is introduced, the performance of high-anxious subjects becomes worse while that of low-anxious subjects improves. Other studies considering stress and its relationship to academic matters include Mechanic (1978), Lloyd et. al. (1980), and Holahan (1979), but no investigations relating stress to academic progress could be found except that of Wall et. al., (1980) who attempted to determine if academic achievement is related to self-reports of perceived stress. They found a relationship

between stress and academic achievement. Scholastic aptitude Test scores, however, correlated more highly with grade point average than did stress sources.

Purpose of the Study

The Purpose of this study was to further investigate the Wall, et. al., finding that perceived sources of stress are related to academic achievement. An hypothesis was made that maladaptive (unhealthy) methods of coping with stress are related to academic achievement in greater magnitude than the relationship of Scholastic Aptitude Tests scores. Chosen adaptations to stress such as "running away," "drinking alcoholic beverages," and "acting out in anger" are usually considered maladaptive.

Method and Data Source

About 800 freshman and sophomore junior college students in intact classes responded to Form III of the Floyd-Steyert Life Stress Inventory. Responses were marked on an IBM 1230 optical scanner. Of the 800 responses, almost 500 had to be discarded because of improper markings, blanks, or unavailability of the criterion variable. Sixty percent of the remaining data source was female.

Form III of the inventory includes three categories of stress self-report: sources of stress, emotional and physiological responses to stress, and methods chosen to cope with stress. McGrath's (1970) definition of stress, stated previously, implies a rationale for investigating stress through the use of a self-report instrument.

Part I of the inventory contains items that cause stress, ie: family, instructors, academic advising, financial problems, etc. on a continuum of severity from zero minimum to seven maximum. Items in Part II concern

emotional and physiological responses to stress such as headaches, dizziness, skin rash etc. Responses in Part II were marked "more than usual," "less than usual," and "does not apply." Part III items deal with methods of coping when under stress and include such items as smoking, engaging in hobbies, eating, and abusing others on a "more than usual," "less than usual," or "does not apply" basis.

The statistical Package For The Social Sciences was chosen for a stepwise multiple regression analysis and for a subsequent factor analysis. There were more than 90 predictor variables including SATV and SATQ. The criterion variable was grade point average. A varimax factor analysis was conducted. Factors with eigenvalues greater than 1.00 were retained. Coefficient alpha was employed to test reliability of the scales (Cronbach, 1951). A scree test was plotted to determine the minimum number of factors needed to account for the maximum amount of variance (Gorsuch, 1974). The factor analysis was based upon 284 cases.

Results

SATV and SATQ produced a multiple R (significant at the .05 level) of .339 accounting for 11.5 percent of the variance (Table 1) in grade point average ($F = 18.34$, $p < .001$).

Table 1

Stepwise Regression Analyses Using SAT and Stress Variables
to Predict Grade Point Average

FACTOR	F Level	Coefficient of Multiple Regression	Coefficient of Determination	Significance Level
Step 1 & 2 SATV & SATQ	18.345	.339	.115	.000
Step 3 Physiological Responses to Stress	15.147	.373	.139	.000
Step 4 Maladaptive Coping Methods	12.827	.394	.155	.000

The necessary minimum number of factors indicated by the scree test was 2 (Figure 1). The factor analysis yielded two significantly loaded factors (Table 2).

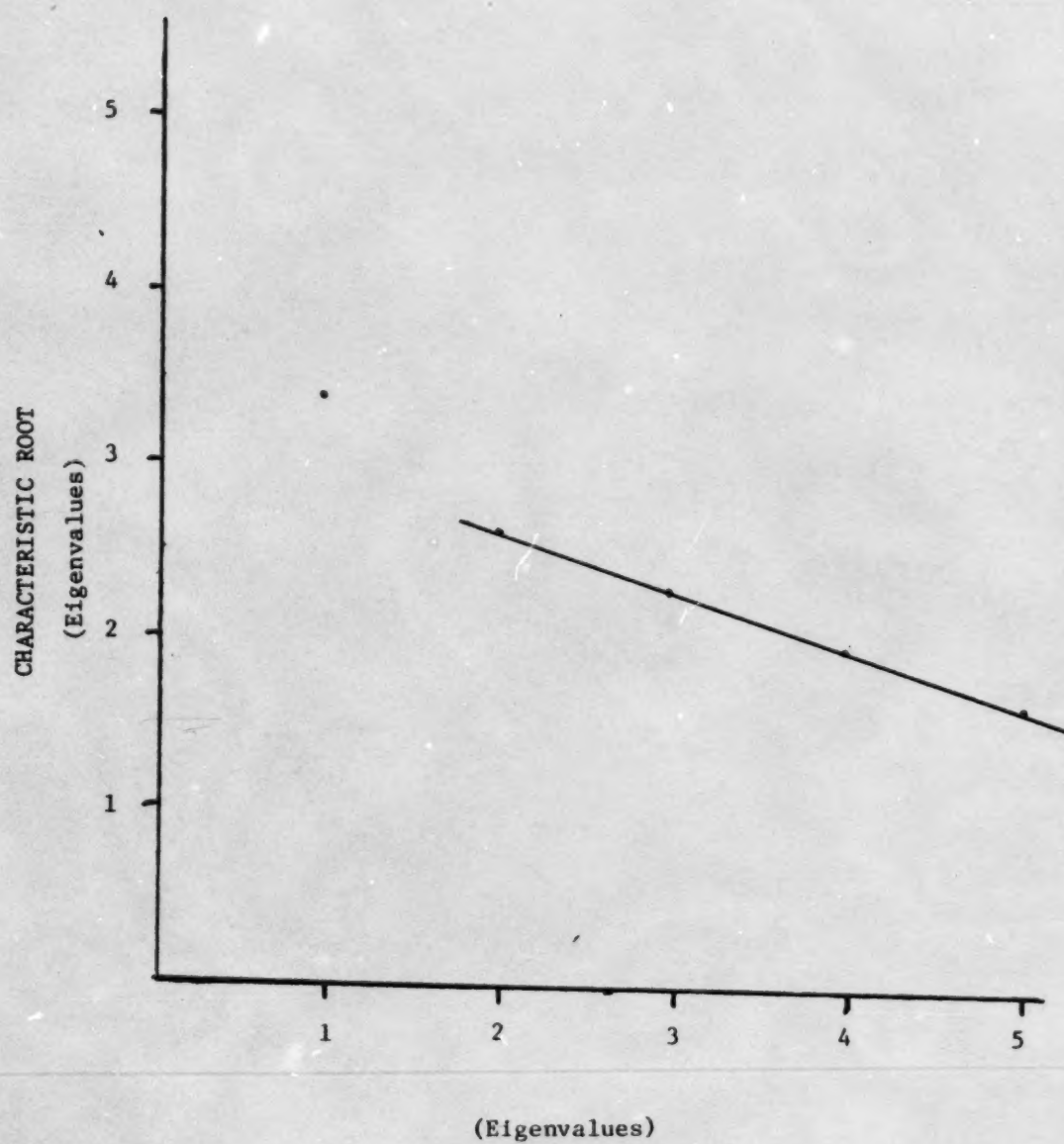
Table 2
Factors and Factor Loadings of Items from Floyd-Steyert
Life Stress Inventory

FACTOR			
31		21	
Maladaptive Coping Methods		Physiological Responses to Stress	
Satisfaction From:			
Abusing others	.557	Experiencing headache	.391
Acting impulsively	.441	Experiencing neckpains	.715
Cutting classes	.430	Experiencing backpains	.741
Drinking alcohol	.488	Experiencing muscular pain	.595
Exaggerating physical complaints	.434		

As shown in Table 1, the hypothesis that maladaptive methods of coping with stress lower academic achievement was supported. Maladaptive coping methods from section III of the inventory significantly reduced to one factor. Factor 31 was labeled "maladaptive methods of coping with stress." Students who employed these methods "more than usual" when under stress and found satisfaction in doing so less often received better grades. Students who do not use these methods, therefore, those who feel no satisfaction from employing them receive higher grades.

Factor 31, labeled "maladaptive methods of coping" contained the following items: abusing others, acting impulsively, drinking alcoholic beverages, and exaggerating physical complaints. The scree test (Figure 1) indicated that only two factors were needed to account for maximum variance.

FIGURE 1
Scree Test
Maldaptive Methods of Coping with Stress
Factor 31



(Eigenvalues)

Factor 1	3.35
Factor 2	2.58
Factor 3	2.32
Factor 4	2.01
Factor 5	1.81

Factor loadings are .55, .44, .43, and .43 respectively (Table 2). The subsequent regression analysis yielded a multiple R of .394, with 15.5 percent of the variance in grade point average significantly accounted for over and above the contribution of what is measured by the Scholastic Aptitude Test ($F = 12.82$, $p < .001$). Reliability of the scales for this factor is : $\alpha = .589$.

Another significantly loaded factor emerged from the analysis. Factor 21 (Table 1), labeled "physiological responses to stress" was composed of the following variables: experiencing headaches, neck pains, back pains, and general muscular pains with loadings of .39, .71, .74, and .59 respectively (Table 2). The scree test indicated that the necessary number of factors was 3 (Figure 2).

Students who responded to stress situations "more than usual" with these physiological reactions received better grades. The multiple R for the regression analysis is .373 significantly accounting for 13.9 percent (Table 1) of the variance in grade point average; another increase over the variance accounted for by the Scholastic Aptitude Test ($F = 15.14$, $p < .001$). Reliability of the scales for this factor is: $\alpha = .731$.

Conclusions and Discussion

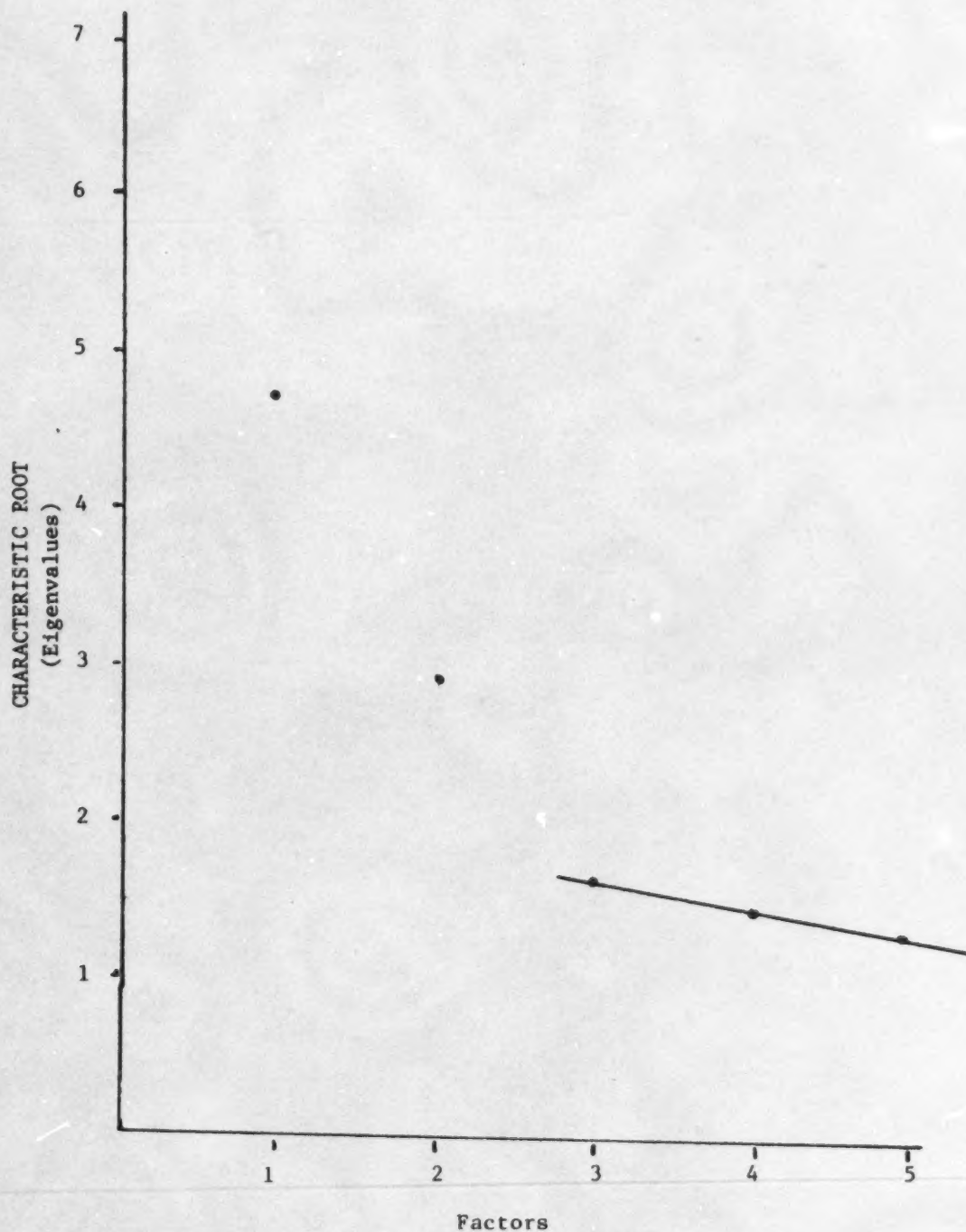
Numerous past investigations have found aptitude and former academic achievement to be predictors of college grade point average. This study was no exception. It is also an obvious and well-known fact that some type of aptitude measure is employed as a predictor of academic success and is heavily weighted in college admission decisions. It is also well-known that scholastic aptitude measures do not account for a high percentage of variance in grade point average. Again, this investigation was no exception with its 11.5 percent.

FIGURE 2

8

Scree Test

Factor 21 Physiological Reactions to Stress



Eigenvalues

Factor 1 5.86
 Factor 2 2.99
 Factor 3 1.79
 Factor 4 1.57
 Factor 5 1.39

Perhaps, then, there is a need to consider some other variables that may be related to college academic achievement. Certainly, abundant studies exist on instructional techniques, textbooks, instructor characteristics, students personality, and the like, but a class of variables that appears neglected in the literature is that of stress. Stress is related to adjustment and adjustment is related to personality. Stipek and Weisz (1981) commented that there has been a proliferation of studies showing a relationship between personality variables and academic achievement over the past decade. They proposed that students' personality or motivation may be more amenable to change than their ability. They then suggested that achievement might be enhanced indirectly through educational practices that positively affect personality and motivational development.

At this point, it is unadvisable and entirely too bold to propose that personality variables, specifically methods of coping with stress, may at some future time serve as better predictors of academic achievement than aptitude measures, however, there are seeds for that thought in this investigation. At the very least, there are implications here for counseling with students having academic difficulty with the focus in a direction other than ability and/or study skills.

Students who adapted to stress by entering into behaviors that are commonly labeled "maladaptive" and found satisfaction in doing so did receive lower grades. While Scholastic Aptitude Test scores accounted for 11.5 percent of the variance in grade point average, maladaptive reactions to stress accounted for 15.5 percent or an increase of three percent. Certainly there is still considerable variance in grade point average that is not accounted for, but this investigation does corroborate the comments of Stipek and Weisz (1981) that personality variables are related to academic success.

Another interesting sideline is the finding that students who reacted with physiological symptoms more than usual when under stress received higher grades than those who did not. This underlines once again that the college experience can be a stressful time. This factor, too, was a better predictor of grade point average than SAT scores. Apparently, these students who received higher grades turn the stress effects inward rather than outward using themselves as scapegoats rather than society.

Limitations and Future Considerations

One of the limitations of this study was the unavailability of the data source in one block of time. It was not possible to present the inventory at one time. Data was collected over a period of nine months in individual classes. Random assignment of respondees was not possible. Several persons were involved in data collection. Instructions were sometimes misunderstood and perhaps contributed to the loss of valid responses leaving about 300 for processing.

According to Gorsuch (1974), 286 cases is a sufficient sample size. The value of .3 was chosen as a minimum loading. In no case were there loadings under .3. The criterion variable was for one quarter, that in which the responses were made.

Since "maladaptive" methods of coping with stress and physiological responses to stress appear to be related to academic achievement, there may be some value in continuing to explore this relationship. Replication is needed on the same type population (junior college with an open-door admissions policy) perhaps with refinements including consideration of those limitations previously mentioned. It might also be of value to submit the Floyd-Steyert inventory to other types of college and university populations. Stress measures other than this particular inventory could be employed to determine if the relationship to academic progress continues to manifest itself.

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